Tampere University of Applied Sciences

Sustainability and environmental management in construction business

Petr Vasilev

BACHELOR'S THESIS
May 2020

Energy and environmental engineering
15IDEE

ABSTRACT

Tampereen ammattikorkeakoulu
Tampere University of Applied Sciences
Energy and environmental engineering
15IDEE

Petr Vasilev
Sustainability and environmental management in construction business

Bachelor's thesis 32 pages
May 2020

The issue of the climate change has been steadily growing since the industrial revolution because of a severe increase in human activity. Today, to tackle the problem and reduce the amount of greenhouse gasses in the atmosphere a concept of sustainability is becoming more and more wide-spread. Companies choose to improve their environmental performance often with the help of the flexible ISO 14001 standard aimed to provide guidance for environmental management implementation.

This thesis is a case study of the first steps taken towards sustainability by a particular branch of the company AECOM that provides technical supervision of construction sites. The thesis is based on the previous work where an environmental management system was developed by the thesis author in accordance with the ISO 14001:2015 standard in order to improve company's environmental impact and reap welfare and economic benefits at the same time. This thesis discusses the results of this experiment for AECOM and potential benefits and weaknesses of the standard.

With the scope of the company being taken into account, a number of documents have been studied during the creation of the environmental management system and other study methodologies were used, including internal auditing of company's offices. An environmental management system was developed and presented to the company along with a set of recommendations for further actions and multiple supporting documents.

It is hard to say whether the developed document ends up being efficient in the future, since the environmental management system has not been implemented yet. Nevertheless, positive benefits achieved by other companies that decided to venture into sustainability and an abundance of opportunities for improvement of AECOM tend to suggest that an implementation of ISO 14001 based environmental management system will likely be an advantageous endeavor even despite the standard having certain flaws of its own.

Keywords: Sustainability, ISO 14001, Environment, Climate change

CONTENTS

GLOSSARY

EMS	Environmental Management System
ISO 14001	Standard by the International Organization for Standardization 14001:2015 - Environmental management systems — Requirements with guidance for use
ISO	The International Organization for Standardization
CSD	Construction Services Department
NASA	National Aeronautics and Space Administration
PDCA	Plan – Do – Check – Act

1 INTRODUCTION

Climate change begins to be a central topic of more and more debates and forums all over the world and the amount of ISO 14001 and EMS research been steadily growing in recent years (Hengky K.S. et al. 2018, 649-652). This concern of humankind grows as more environmental issues are being discovered and observed. At the same time, positive counteracting developments like environmental management and sustainability movements may provide compelling tools for solving opposing issues caused by industries.

This thesis studies a branch of the company AECOM that is trying to achieve more sustainable business practices and tries to answer the question whether such practices are beneficial to consider in the first place. The company was established in USA and operates in many different countries across the globe. The main business activities of AECOM are construction technical supervision, designing and consultancy. Work that was used as a base of this thesis was carried out under the employment in the Construction Services Department (CSD), which is a business line of AECOM that carries out technical, health and safety supervisions on various construction sites and projects of its clients.

AECOM's desire to advance into a more sustainable way of business raised a need for an environmental management which led to an opportunity for this thesis creation.

AECOM decided to approach its sustainability development from a few different directions including ensuring full compliance with relevant legislation, creation of an ISO14001-standard-friendly environmental management system (EMS), establishing and executing carbon dioxide reduction plan and raising employee awareness about sustainability.

The project took place in 2018 during the author's practical training under the employment of construction and services department in the Russian branch of AECOM. The main task of said practical training was the creation of environmental managements system for the main central Moscow office and one temporary

office located near the project “Park Huaming” that after its implementation would allow achievement of ISO 14001 certification and would lead to reduction in greenhouse gases production by the company’s business activities. Simultaneously, thesis’ author was tasked with helping establish a volunteer organization within the company, which would assist core environmental team, and creating any other potentially useful documents for the purpose of easing AECOM’s first steps towards sustainability.

Thus, this paper discusses main challenges of the conducted work and describes the most important parts of the environmental management system, including the underlying requirements, its formation and gives a general outlook on the process tied to an initial sustainability adoption within a company. At the same time, it attempts to determine whether sustainable development can bring potential benefits for a company like AECOM and looks at the result of the entire process in the end.

2 THEORETICAL BACKGROUND

2.1 Climate change, a driver of sustainability development

Since the beginning of industrial revolution in 18th century the Earth has seen a significant increase in manufacturing activity, automatization and the use of fossil fuels. Now, a general scientific consensus on anthropogenic global warming has been achieved, proving that this overwhelming adoption of fossil fuels use has been and is causing negative effects to the climate of Earth. In fact, 90 to 100% of scientists agree on the cause of the climate change being industrialization (Cook J. et al. 2016, 6).

Sun's role in the climate of the planet is crucial, but while some individuals tend to argue that a large portion of the climate change can be attributed to the increased solar activity, which would immediately prove all environmental management developments to be meaningless regarding resolution of recent climate decay, the solar radiance changes effects on climate since 1750 are insignificant comparing to anthropogenic sources (Fahey D.W. et al. 2017, 2.3.1). Furthermore, the average sun radiance since 1750 has seen no significant increases and remained on a fairly similar level (NASA, 2020).

Thus, conducted research suggests that the core driver of the shift in atmospheric conditions is human activities. Among all, several largest contributors of the greenhouse gas emissions are depicted by their shares in the following Figure 1: Greenhouse Gas Emissions by Economic Sectors in 2010.

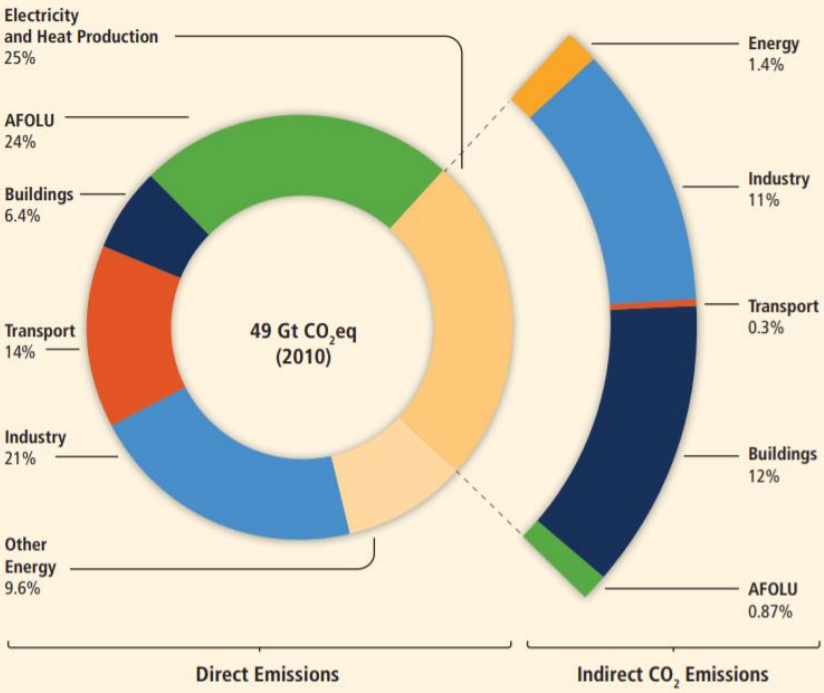

Figure 1 Greenhouse gas emissions by economic sectors (Edenhofer O. et al 2014, 9)

2.2 Environmental policies

Climate change mitigation is achieved through either reducing polluting sources or advancing greenhouse gas sinks. To this end, more sustainable practices have to be designed and implemented by the policymakers with the use of environmental policies. It is a great tool for repairing environmental decay caused by humanity that can be utilized by all parts of society – governments, organizations and public, and all three should do so.

Governments' proactive sustainability-focused thinking is of the highest priority of the three, since the commitment of the ruling powers is what causes change, but also because in the case of USA the army's environmental impact is very considerable with the Department of Defense being the largest consumer of energy in the country and the largest landlord (Light S. 2015, 1). Adjusting the practices of this giant to become more sustainable could singlehandedly remove tonnes of carbon dioxide and equivalent gases from the atmosphere annually.

Along with following governmental legislation, independent organizations choose to voluntarily achieve certifications with standards like ISO 14001. Regardless of

the underlying motives, if such procedure ends up enhancing a firm's environmental performance – it can only be beneficial for the planet.

But also, the public can play a role in sustainability development and not just through electoral decision-making. One of such examples is a legislative ban of chlorofluorocarbons – a substance responsible for a partial depletion of the ozone layer over the South Pole, in the end of 20th century driven by the consumer demands (Roberts J. 2010, 127-130). Public pressure can in fact force the hand of fate by setting up new expectation from the companies that latter will have to satisfy.

2.3 Benefits of an EMS

According to International Organization for Standardization (2020) environmental management helps companies strive towards a healthy balance between the environment, society and the economy. To benchmark and compare their sustainability performance, a need for a worldwide systematic approach applicable to any business no matter the model and size. To this end, a series of standards of the family of ISO 14000 were created in late 1996. They cover a wide variety of subjects from product's life-cycle assessment to, most-importantly, the environmental management system implementation itself (International Organization for Standardization, 2020).

Other than environmental improvement sustainable development often leads to other benefits including welfare and monetary improvements (Edenhofer O. et al. 2014, 17). Cheremisinoff and Bendavid-Val (2001, 175) highlight that while creating a new branch of management is a costly and time-consuming operation, benefits of a well implemented environmental management system tend to outweigh its costs. Following potential advantages are most impactful for the company:

1) *Better overall business performance*

Caused by more responsible resource allocation, including more advance monitoring practices leading to minimizing waste and energy consumption;

2) *Readiness for the possible upcoming changes in environmental regulation*

Having a well-prepared and trained environmental team and top management may smooth out a sudden transition forced by an upcoming legislation or other compliance change;

3) *Long-term sustainability*

Honest timely environmental management minimizes the possibility of unexpected liabilities, hidden operational costs and potential accidents;

4) *Improved access to capital*

In some cases, external investors may be inclined to give a loan on better conditions to a more efficient and mature company;

5) *Pollution prevention*

Better resource, waste and energy management decreases company's carbon footprint;

6) *Better public relations*

A more environmentally-responsible company tend to win additional favours from potential clients not only because of its commitment to minimize company's environmental impacts, but also through company's credibility improvement, because of a need for a third party certification unit. (Cheremisinoff N. P. & Bendavid-Val A., 2001, 175-177.)

While some of these benefits clearly cannot be measured monetarily, plenty of companies just in the building business alone have already reaped benefits of sustainability and saved considerable amounts of money in the process (Scott, J. T., 2013, 116-118).

2.4 ISO 14001

One of the most prominent documents related to environmental management is international standard ISO 14001:2015. Environmental management system is the core document requirement of the standard. It follows commitments of top management of the company indicated in an environmental/sustainability policy. A well-established EMS serves as a set of guidelines for all sustainability-related actions within the company. It is designed to be a handy tool in the hands of the environmental team and describes what actions need to be taken, how often, who is responsible for each step and more.

The beauty of the standard is hidden in its applicability to a business of any size and shape. ISO 14001 does not provide any exact instructions for the company to follow, rather it outlines the requirements for the environmental management system itself and demonstrates what parts it must contain.

A very important part of the sustainability management establishment is examination of the company's scope. The company is to consider its environmental objectives and aspects that are relevant to its purpose as well as needs and expectations of all of the interested parties as the first step of environmental management implementation (International Organization for Standardization, 2015b, 6 – 7).

Since these pillars of management can and will change in future (possibly with the context of organization as a whole), one of the core principles for sound EMS implementation is continual improvement. This is why ISO 14001 standard heavily emphasizes the use of a model of a Plan – Do – Check – Act (PDCA) cycle that aims to create an iterative repetitive process of improvement shown on the Figure 2: PDCA Cycle (International Organization for Standardization, 2020).

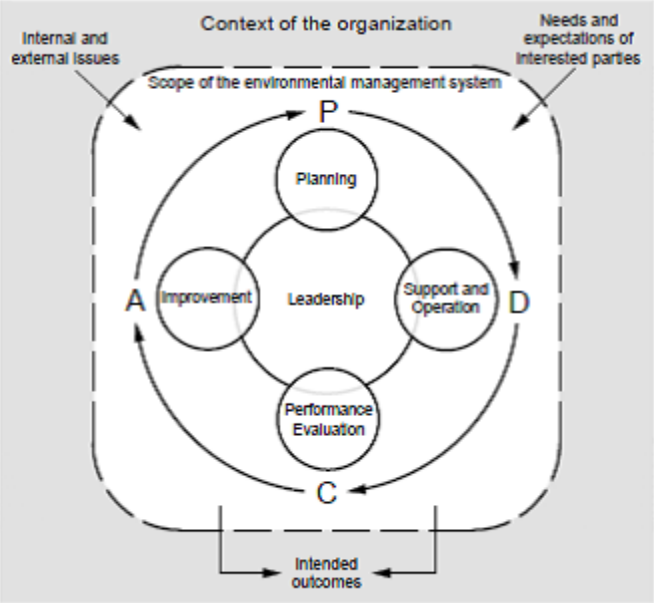

Figure 2 PDCA Cycle (BSI Standards publication, BS EN ISO 14001:2015, 2015, VII)

The main idea of this principle is applied to the environmental management as a whole or to any of its components. Methods to counter company's environmental impacts are planned, executed, results are measured and reviewed, further actions are taken. This ensures constant relevancy of a management system and always-fresh environmental objectives.

Main parts of the ISO 14001 friendly Environmental Management System focus on environmental policy, legal compliance, planning, implementation of improvements, review and reporting.

2.5 ISO 14001 certification results

A study conducted in USA has successfully collected data from over 120 manufacturing companies pursuing ISO 14001 certification and proved that ISO 14001-friendly EMS implementation managed to reduce waste production in all different manufacturing industries (Franchetti M., 2011, 1107 – 1109). Depending on the size, 120 companies potentially can have a very substantial environmental impact on the planet and can definitely be considered a large sample size for the study. Even smaller environmental performance improvements of a vast amount of firms will add up over time as each of them represents a part of industry as a whole.

Certain companies have even managed to achieve zero-waste-to-landfill policy goals already (International Organization for Standardization, 2015a, 9).

Additionally, a similar Australian study has likewise proved that generally companies tend to achieve what they are seeking from the ISO 1400certification, even if their initial goals do not include environmental performance improvement (Prajogo D., Tang A. K. Y. & Lai K., 2012, 124).

These positive results tend to suggest that ISO 14001 certification does have very real possibilities of improving firms' environmental impacts, but are further discussed in the "Conclusion" part of the thesis.

3 ACCOMPLISHED WORK

3.1 The issue

AECOM is a large company and it deals with construction sector even if not always directly. This means that the organization covers two sizable economic sectors as shown on the Figure 1. It has a notable potential of decreasing greenhouse gas emissions through sustainability development and even the capability of influencing its stakeholders, clients and subcontractors.

Luckily, being a large global company, AECOM has already successfully implemented environmental management in many offices and projects and some of them have already received ISO 14001 certifications. However, often a temporary office is built on the construction site of the project to allow technical supervision teams to be in a close proximity to buildings. Due to this abundance of unique working stations, managing anything from construction of bridges, tunnels, hotels to nuclear stations, and more conventional central offices spread across countries implementing just one company-wide environmental management system proves to be virtually impossible without making it extremely complicated, which likely will become financially not viable considering required frequent and regular revisions. Thus, environmental management should be downscaled to become at least region-wide.

In early 2018 Russian CSD, being a part of Europe and Middle East region, has received an order along with an action plan laid out for the region to start developing its sustainability program covering several main paths outlined in the introduction of the thesis.

3.1.1 Environmental management

To begin with, ISO 14001 certification had to be attained and maintained for the headquarters of the department. This objective implied several smaller targets. For instance, a responsible person for monitoring environmental performance

and changes in environmental legislation has had to be selected. ISO14001 compliance gaps have had to be identified and an action plan to rectify them has had to be developed accordingly. Since the branch did not have the core document for the ISO14001 certification – environmental management system, it became the main pillar of the rectification plan. The author of the thesis was temporarily entrusted with a role of environmental management overseeing and the development of the EMS has begun. Its implementation and proper use would correct environmental issues and compliance gaps, reduce company's carbon dioxide impact, potentially reduce spending through resource consumption reduction and satisfy the requirements of the certification at the time – such was the plan.

One of the main challenges of the task was a lack of environmental professionals in the central office of Moscow. With this in mind, the environmental management system and all related documents were tailored together in a way that even an untrained professional of a different field would be able to comprehend and use this tool to achieve sustainability advancement. The document was developed in the most straightforward way possible while aiming to describe all principals and steps thoroughly and satisfy the standard's requirements.

3.1.2 Green teams and competence

Additionally, one of the orders sent out from the central European office was focused on the social aspect of the sustainability.

First, a so-called "Green team" would be created as a concept and later spread to 50% of offices and projects in Russia. The idea was that a "green team" would consist of volunteers from around the company (later – from around each office) passionate about improving the sustainability state of their surroundings. The team would gather through an online or face-to-face conference with regular intervals to discuss their ideas of improving the office and brainstorming potential solutions. Their main goals would include, among other, promotion of more sustainable travel, energy and resource use and further office's environmental impact reduction where possible. To get this done, members of the "green team" had to be identified and their responsibilities had to be determined. Alongside the

EMS development the team was established and met through an online conference a few times. This group of people consisted of various professionals of AECOM from different projects, mainly within Moscow and Saint-Petersburg. They were introduced to the issues outline by the central European office and were familiarized with the environmental management system and related documents, which were mostly developed at the point of the contacts.

Due to members of the team being volunteers, they were unable to find a sufficient amount of free time and meet frequently to advance sustainability promptly. Additional layer of complications came from their natural spread across the country or even a city and inability of centralized organized actions.

Furthermore, Russian CSD was tasked with raising employee sustainability awareness. It is a good idea to, at the very least, introduce all staff members to common environmental issues and company's counteractions. This may potentially lead to better passive handling of waste, electricity, resources around the office of everyone who works there.

By the content of the environmental management system, this was recommended to be done through the mandatory annual employee training.

3.2 Environmental management system development

By far the largest task of the thesis author's employment was the creation of environmental management system. Before the start of the development, a research of all similar existing company documents from other regions and branches was conducted, alongside the literature related to environmental management and ISO 14001 standard. For instance, a broad equivalent document about health and safety procedures on building sites was partly used as an inspiration for the EMS.

As a result, AECOM's branch gained a straightforward starting point of its environmental management implementation. It can and should be expanded and/or modified in the future to cover natural changes within the company according to PDCA cycle.

It was decided to use the skeleton of the standard ISO 14001 itself to create a structure of the management system and describe all its relevant parts considering the scope of the company in an easy to follow fashion. Main segments of the EMS are discussed more thoroughly below.

3.2.1 Legislation

One of the most tedious parts of the EMS creation was figuring out all applicable environmental laws to the company's business. It required extensive study and use of resources such as previously developed company register of some applicable laws and a worldwide collection of environmental legislation presented through an internet information service ECOLEX. Looking back, perhaps this process could have been sped up and improved if help from a professional lawyer within the company was sought. It is a rather challenging task for a company to consider all aspects of the company and find out everything it must comply with, without missing anything out, considering a widespread nature of AECOM's operations. Regardless, a document containing the majority of applicable legislation units was created and presented alongside the environmental management system in the end.

3.2.2 Needs and expectations of interested parties

Clients, AECOM top management, employees, other 3rd parties including governmental structures and any other stakeholders are considered interested in the environmental performance of the company.

Clients are looking forward to work with an ISO 14001 certified company with a commitment to constantly improve its environmental performance while complying with the local legislation. Governmental structures are only interested in the country legislation compliance. Top management of AECOM is willing to develop the company in the most sustainable way possible, which implies achieving corporate goals of CO2 reduction and ISO 14001 certification for all the offices and projects. Employees are interested in improving their life quality and the environ-

ment of the office while consequentially becoming more environmentally responsible and hopefully carrying the same mentality to their everyday lives influencing families, homes.

To this end, a commitment of the company is shown through the environmental policy and actions are taken to advance the environmental performance of AE-OCM.

3.2.3 Environmental policy

Simultaneously with EMS, a simple introductory version of environmental policy has been developed as well to go along with it. Although it does not meet all the criteria set by ISO14001 standard, it can serve as a starting point for implementation and should be upgraded during one of the first cycles of a regular environmental management review after its implementation according to the EMS. It was meant to display the commitment of the executives of the company towards a more sustainable approach.

3.2.4 Environmental impacts

Depending on the project/office not all of the company's environmental impacts will be applicable to the site. This is why an individual environmental plan, which could be a part of project/office Safety, Health and Environment plan, needs to be developed for every case. The Environmental Management System does not list all of the company's environmental aspects, but provides a couple of tools for local environmental teams to use. This approach seems more flexible and generally makes more sense considering the context of the company.

It is a wise choice to carry out environmental impact assessment before a new temporary project/office begins to operate to identify potential harmful effects of the site and implement appropriate countermeasures during the construction phase.

Once all environmental aspects are selected, the most significant of them are chosen to list critical points of the site's sustainability plan and to form a list of

environmental objectives. Significance of the environmental impacts of the site is recommended to be assessed with a use of the Figure 3: Risk assessment matrix that was developed as a part of the environmental management system.

Risk Assessment (RA) Matrix					
Severity	**Probability/frequency**				
	Frequent (F)	**Likely (L)**	**Occasional (O)**	**Seldom (S)**	**Unlikely (U)**
Catastrophic (C)	E	E	H	H	M
Critical (Cr)	E	H	H	M	L
Marginal (M)	H	M	M	L	L
Negligible (N)	M	L	L	L	L

P "Probability" is the likelihood to cause an incident or a near miss or frequency of a current environmental issue. It is identified as: Frequent (F), Likely (L), Occasional (O), Seldom (S) or Unlikely (U).	**RA Chart**
S "Severity" is the outcome/degree of a potential incident or near miss or a severity of a current environmental issue. It is identified as: Catastrophic (C), Critical (Cr), Marginal (M), or Negligible (N)	E = Extremely High Risk/Impact H = High Risk/Impact M = Moderate Risk/Impact L = Low Risk/Impact

Figure 3 Risk Assesment Matrix

3.2.5 Environmental objectives and planning to achieve them

Another one of the AECOM Environmental Management System's appendices is aimed to provide advices on dealing with the most common environmental aspects. It is designed to aid local sustainability teams in the process of choosing the right course of actions on a path towards more sustainable operations.

Since one of the core principals of environmental management is continuous improvement – this and other parts of AECOM's EMS are to be reviewed and improved if necessary on a regular basis to keep up with potential changes in legislation, ISO14001 or general sustainability-related technological advances. Granted sustainability movement in Russian region is rather fresh, there is plenty of opportunity of improvement.

3.2.6 Roles and responsibilities

Understanding of roles and responsibilities within the company is vital for its success. Same is true in every smaller department and team. To make the job easier for the person responsible for environmental management they should be familiar with the subject to a certain extent. Thus, a company needs to determine this level of competence for all staff members involved in the process (International Organization for Standardization, 2015b, 11). To this end, a corresponding part of the developed Environmental Management System was added to avoid as much of confusion and disagreements. In it different environmental related tasks, roles and responsibilities are assigned to different staff members and separated into parts according to the company hierarchy.

3.2.7 Competence

A certain degree of competence is required from a person working with environmental management system and everything around it, even if it was written in the simplest language. It is vital for the project managers to understand the importance of sustainability development and to be able to evaluate proposed goals and further actions regarding it, including reporting from the environmental team. At the same time, regular employees are educated to an extent on the matter as well as described above to raise their awareness.

To this end, as a part of environmental management system, a document called “Training matrix” was developed presented in Figure 4: Training matrix below.

Since the company actively forces its employees to take interactive courses annually in the AECOM’s intranet on anticorruption, respectful behavior, health and safety and more, it should not come as a challenge to add one more course on sustainability or at least expand an existing course to include it. This method of training, repeated every year, will prove effective in raising overall environmental awareness within the company. Other staff members with more responsibility should undergo more extensive training where needed.

- Recommended
- Mandatory

№	Environmental training required		Project Manager	Green team members	SH&E Team members	All AECOM staff
1	ISO 14001 (Carried out by a third party)	ISO 14001 101				
		ISO 14001 Auditing				
2	Sustainability Training Courses available on the AECOM University	Advanced Project Management: Sustainability in Project Management				
		Building a Sustainable Future				
3	LinkedIn Learning Courses	Sustainability strategies				

Figure 4 Training matrix

3.2.8 Environmental reporting

Large companies nowadays tend to report their sustainability performance. It helps boost the brand name, provide socio-economic benefits and see results of environmental management performance itself. This is an important part of the ISO14001 standard as well. Therefore, the same was recommended to AECOM.

Annual (typically) reports shine the light upon the company's recent advancements/achieved targets (or failures) within the environmental management and outlines the next set of goals the company has identified to be important for the next period. In the case of AECOM's environmental management, it is defined that competent personnel is responsible for monitoring, reporting and planning of attaining corresponding goals. The process is to be supervised and approved by top management team according to the EMS.

It is important that the most relevant information is documented properly and delivered to all interested partied stated before with regard to their interest. Reporting is a crucial part of this process. Both internal and external communications are carried out by a specially created document outlining different levels of involvement with the company's environmental management. At the same time,

this communication often aims to be two-way, so that all stakeholders are able to provide relevant feedback if needed.

3.2.9 Performance review

Most important indicator of environmental performance of AECOM is greenhouse gas emission because almost all the company's environmental impacts can be converted into it and the corporate environmental goal is built upon reduction of greenhouse gas emissions. Since the company mainly operates within offices, overall environmental performance is as such measured by monitoring the extent of completing of environmental objectives set for different sites.

This can be done through regular reporting of most common and simplest environmental impacts like water, paper and energy use of the offices, but a more potent method of performance review is internal auditing. To satisfy the PDCA cycle, it should be carried out regularly by the central office environmental team or most competent staff on the cite in most remote locations. All offices and projects should be regularly audited and to facilitate this a corresponding appendix to the environmental management system was added that thoroughly describes the process and quite literally – what should be looked at. This procedure is designed to be a mini-version of the ISO14001 external audit, so it focuses on all of the most important parts of the environmental management of the cite that is usually checked by external inspectors.

Additionally, external audits are carried out by the ISO14001 certificate issuing company first time before issuing the certificate and regularly after to maintain the validity of the certificate, typically – every three years.

3.2.10 Continual improvement and ensuring success

Since the core of the standard is all about continual improvement, a company should never stagnate and always strife to better itself, which is especially true for the sustainability. Once all compliance with all obligations is achieved, all significant environmental aspects are taken care of and all corresponding countermeasures implemented, an advice could be sought from the Central Office Health

Safety and Environment Manager or Green team members to establish new goals.

Since working with Environmental Management System is a rather complicated task, especially for a potentially untrained professional, one of the last of its parts was developed with the philosophy of making EMS straightforward and clear. It is a simple yet effective appendix designed to facilitate the use of the document and to show how often exactly all actions related to sustainability (such as regular reporting, reviewing, communication and more) shall be carried out.

Being the core of sustainability, it is of utmost importance that the EMS is made as close to perfect as possible, which is definitely achievable through continual improvement.

4 Findings

Over the three-month period of the conducted work, review of existing company literature, management procedures installed in occupational health and safety department, which tend to be somewhat similar in nature to environmental management, and internal auditing of two offices (The Moscow Central office of CSD and a temporary AECOM office of the construction site “Park Huaming”, where the majority of work related to EMS development has taken place) of the department have helped outline several features regarding the current state of the department’s environmental management.

The central office is concerned with its environmental performance to some extent and already utilizes several environmentally-friendly techniques. For instance, used up office paper is being recycled and all new paper is purchased from the Forest Stewardship Council marked companies, meaning the paper source is managed responsibly, and in addition some of the purchased paper has already been recycled. The Moscow central office also uses several approaches for energy saving through smarter light and ventilation practices.

However, several shortcomings have likewise been observed. For instance, the water-saving mater can see some improvements due to noted complete absence of urinals, that tend to utilize significantly less water than an average toilet bowl, in male bathrooms or lack of dual-flush buttons in the toilets. A renovation will be required to facilitate new installments, which is why it is important for a company like AECOM to consider environmental performance of their office before their deployment.

The credit shall be given where the credit is due for the Russian CSD of AECOM is taking employee welfare into account, which is seen through small initiatives like a “Fruit day” where several times per month free fresh fruits are delivered to offices for the company employees to enjoy. Additionally, on certain days a doctor is present in the central office able to carry out common medical duties so that employees do not have to leave the workplace for too long, travel to the hospital and waste unnecessary additional time.

The difference between the environmental performance of the central office and the temporary one is substantial. For instance, inspection of the temporary office within the “Park Huaming” project in Moscow has identified several significant environmental aspects including:

Water use:

- Inefficient use of water was observed because of a lack of eco-friendly office bathroom equipment (flow limiters on taps);
- Accidental spills and infrequent leakages due to poor quality of water communications;

Resource use:

- Use of toilet paper for hand wiping (instead of utilizing cloth towel roll dispensers or air fans);
- Excessive printing;
- Excessive amount of data stored on a shared project server (employees are often asked to delete useless data, the server is almost full most times, the company if forced to purchase additional hard discs for storage space);
- No paper recycling;
- Use of an inefficient boiler for water warming;
- Other negligent use of resource by employees (not too frequent);
- No employee in charge of regular site inspections and performance reporting.

Assuming the inspected office represents an average temporary office located on the construction site, of which the company has created many, Russian CSD of AECOM can undergo significant environmental performance improvements.

Unfortunately, some environmentally-sound technologies are not yet accessible in the developing environmental sector of Russia. Such, there was no possibility

of instalment of cloth towel roll dispensers commonly used in Finland. Nevertheless, even if the more basic solutions are introduced to all common and temporary offices of the company, the resulting improvement in the environmental performance and economic benefits through resource saving could be very substantial.

5 CONCLUSION

At the end of Summer 2018 AECOM's Russian branch received a complete package of documents required to begin an implementation process of environmental management in both Russian and English languages. It is now their task and responsibility to realize it. One of the most important and impactful recommendation that can be given to the company is to pick from existing or hire a new staff member with corresponding background to take on the reins of environmental management. After the initial implementation, it would be wise to upgrade or completely replace the weakest points of this document package, since some of its parts are far from perfect. Not the same amount of time and effort was dedicated to all of these components due to a number of reasons, such as challenges of the project or little importance for the purpose of initial introduction process. For instance, environmental policy and the collection of applicable laws should likely be checked and improved upon first after implementation of the environmental management system and reviewed thoroughly after that with regular intervals, given the importance of these two documents for the advance of sustainability.

When it comes to Green Teams development, perhaps if the idea is tested on a smaller scale, in one office or project it would be more advantageous. Unfortunately, since many locations are running with not more than 30 people it can be tricky to find enough volunteers to take this role. This puzzle remains to be solved by AECOM, but with a little more patience and commitment from the top management it can yield fruitful results.

5.1 But is it all worth it?

Throughout the years there were a number of studies critiquing ISO 14001 certifications and rightfully so. The standard cannot be perfect in its current form because of its mass appeal to organizations of all shapes and sizes. As Heras-Saizarbitoria I., Dogui K. & Boiral O. (2013, 95) note, the ISO 14001 certificate is a reliable sign that **an EMS has been adopted and implemented by the company**, but not of its environmentally proactive thinking. Although a more recent version of the document (ISO 14001:2015) has come out since, the standard did

not receive a significant change in regards of environmental performance review. With regard to sustainability, a theoretical company manufacturing nuclear warheads or other cruel equipment could fulfill all requirements of the standard and achieve ISO 14001 certification, but that would hardly make it any more sustainable.

Additionally, the validity of the certificate rests on the external auditor's credibility. Some of which tend to overlook actual environmental performance in favor of practicality of the EMS and its implementation correctness. In developing and undeveloped countries, where ISO 14001 certification has not been adopted on a mass scale, the lack of competition among the certification bodies may even facilitate existence of unfaithful and negligent auditors. Simultaneously companies that pursue ISO 14001 certification simply for the sake of the prestige of the paper are able to fabricate fake documents once a year/several years as required by the external auditor for the purpose of recertification. Hopefully, not all is that doom and gloom in the vast majority of cases.

Ultimately, "Managers should use the ISO 14001 as leverage for internal improvements and clarify with certification bodies the content and form of external audits in order to be more focused on the substance rather than the form." (Heras-Saizarbitoria I. et al 2013, 95). Though potentially flawed to some extent, ISO 14001 is perhaps the best widely-known environmental management standard there is today. And as stated in the theoretical background part of this thesis, the correct implementation of the EMS can bring and already have brought sizable benefits to many companies. Those seeking to gain this prosperity definitely should focus on the sustainability improvement part of the environmental management, rather than on a straightforward EMS-document implementation.

Additionally, a large amount of companies that chase ISO 14001 certification, do so driven by promised economic benefits and cutting edge competitive advantages as oppose to its original purpose – environmental decay repair (Prajogo D. et al., 2012, 123-124). However, if companies decide to go "Green" now to increase their public appeal, as more and more firms utilize this strategy, it may become less attractive and flashy, so such firms may be forced to actually show results of their environmental performance in the future to keep up with more

environmentally-mature competitors. Theoretically, this could also lead to positive improvements further on down the road.

There are other standards that pursue similar goals as ISO 14001, like British Standard 8900, that also focuses on the social aspect of sustainability, but they have not received as much attention yet and ultimately are not the purpose this paper. Perhaps in the future one of such standards will manage to become a step forward from current environmental management practices.

5.1.1 With regard to climate change

Previously mentioned studies tend to suggest that improvement of environmental performance by the industry sector, being one of the biggest contributors to the carbon dioxide emissions and equivalent worldwide, should have a powerful and beneficial effect on the amount of greenhouse gasses in the atmosphere and the environment as a whole. But even if not – going “greener” is a sound and responsible thing to consider. Even if the majority of studies are wrong, if the climate change is not caused by anthropogenic activities, but the solar activity or if it is just some other cosmic cycle, humanity will be able to rest knowing that it has done everything possible to mitigate risks of severe climate change. While certain events are out of our control, it is a good idea for policymakers worldwide to contemplate tightening current environmental regulations and taking environmental performance more seriously.

5.2 But was it all worth it for AECOM?

When it comes to Russian CSD of AECOM, on a larger scale, it has not spent a significant amount of its resources on the development of the EMS. Unfortunately, since the implementation of the EMS has not been carried out before the completion of this thesis work, it is hard to say how efficient and potent the developed document turned out to be.

If CSD chooses to become more seriously involved with sustainability management, one of the most important things the department is recommended to consider is making sure that the offices, including the temporary ones created on

construction sites, are built with more sustainable practices in mind during the very initial stage of the construction to avoid the need of renovation further on down the road when environmental regulations might be tightened.

Perhaps Russian CSD could improve the process of environmental management development with the help of its foreign colleagues. The company has offices all around the world, many of which contain **teams** of environmental professionals. It would prove wise to utilize their knowledge, given a very similar nature of business and potentially rather realistic cooperation opportunity. Environmental consultations can be outsourced to a certain extent and could at very least be used harvest experience on the matter. However, Russian department has yet to consider this.

Nevertheless, at the very least the central office of the department is concerned with its environmental performance as mentioned in one of the findings of this paper. Given enough time, this positive practice can undoubtedly spread to other offices and regions. Ultimately, the actual further result will depend on the commitment of the top management and their actions.

REFERENCES

1 BSI Standards Publication. 2015, *BS EN ISO 14001:2015 Environmental management systems — Requirements with guidance for use*. Accessed April 2020. Available from: https://www.bsigroup.com/en-GB/iso-14001-environmental-management/

2 Cheremisinoff N. P. & Bendavid-Val A. 2001, *Green Profits : The Manager's Handbook for ISO 14001 and Pollution Prevention*. Boston: Butterworth-Heinemann. Accessed April 21, 2020. Available from: http://search.ebscohost.com/login.aspx?direct=true&AuthType=cookie,ip,uid&db=nlebk&AN=205725&site=ehost-live&scope=site.

3 Cook J., Oreskes N., Doran P. T., Anderegg W. R. L., Verheggen B., Maibach E. W., Carlton J. S., Lewandowsky S., Skuce A. G., Green S. A., Nuccitelli D., Jacobs P., Richardson M., Winkler B., Painting R. & Rice K., 2016, *Consensus on consensus: a synthesis of consensus estimates on human-caused global warming*. Environmental Research Letters, Volume 11, Number 4. Accessed May 2020. Available from: https://iopscience.iop.org/article/10.1088/1748-9326/11/4/048002

4 Edenhofer O., Pichs-Madruga R., Sokona Y., Farahani E., Kadner S., Seyboth K., Adler A., Baum I., Brunner S., Eickemeier P., Kriemann B., Savolainen J., Schlömer S., von Stechow C., Zwickel T. & Minx J.C., 2014, *Summary for Policymakers*. In: Climate Change 2014: Mitigation of Climate Change. IPCC. Accessed May 2020. Available from: https://www.ipcc.ch/site/assets/uploads/2018/02/ipcc_wg3_ar5_summary-for-policymakers.pdf

5 Fahey D.W., Doherty S.J., Hibbard K.A., Romanou A. & Taylor P.C., 2017, *Fourth National Climate Assessment*, Volume I, Chapter 2. U.S. Global Change Research Program: Washington, DC, USA. Accessed May 2020. Available from: https://science2017.globalchange.gov/chapter/2/

6 Franchetti M. 2011, *ISO 14001 and solid waste generation rates in US manufacturing organizations: an analysis of relationship*. Journal of Cleaner Production 19. Accessed May 2020. Available from: https://www-sciencedirect-com.libproxy.tuni.fi/science/article/pii/S0959652611000084

7 Hengky K. S., Padfield R., Sune B. H., Shaza E. M., Ali Y., Khadijah S., Mun H. T. & Papargyropoulou E., 2018, *Global trends in environmental management system and ISO14001 research*. Journal of Cleaner Production 170. Accessed May 2020. Available from: https://www-sciencedirect-com.libproxy.tuni.fi/science/article/pii/S095965261732005X?via%3Dihub

8 Heras-Saizarbitoria I., Dogui K. & Boiral O., 2013, *Shedding light on ISO 14001 certification audits*. San Sebastian, Spain, Quebec, Canada. Accessed May 2020. Available from: https://www.researchgate.net/publication/256045984_Shedding_Light_on_ISO_14001_Certification_Audits

9 International Organization for Standardization, 2015a. *ISO 14001 - KEY BENEFITS*. Accessed May 2020. Available from: https://www.iso.org/files/live/sites/isoorg/files/store/en/PUB100372.pdf

10 International Organization for Standardization, 2015b. *ISO 14001:2015 Environmental management systems — Requirements with guidance for use*. Accessed April 2020. Available from: https://www.iso.org/standard/60857.html

11 International Organization for Standardization, 2020. *ISO 14000 family – Environmental management*. Accessed April 2020. Available from: https://www.iso.org/iso-14001-environmental-management.html

12 Light S., 2015, *The Military-Environmental Complex*. Environmental Law Reporter, 45(8). Accessed May 2020. Available from: https://advance-lexis-com.libproxy.tuni.fi/document/?pdmfid=1516831&crid=7c6e13a6-1a45-4f73-8586-7c1149b68ce9&pddocfullpath=%2Fshared%2Fdocument%2Fanalytical-materials%2Furn%3AcontentItem%3A5H70-1PV0-002M-62PS-00000-00&pdcontentcomponentid=5418&pdteaserkey=sr1&pditab=allpods&ecomp=kb63k&earg=sr1&prid=21809fca-d58c-451b-bc88-4c5fb9eccddb

13 NASA, 2020, *The Causes of Climate Change*. Accessed May 2020. Available from: https://climate.nasa.gov/causes/

14 Prajogo D., Tang A. K. Y. & Lai K., 2012, *Do firms get what they want from ISO 14001 adoption?: an Australian perspective*. Journal of Cleaner Production 33. Accessed May 2020. Available from: https://www-sciencedirect-com.libproxy.tuni.fi/science/article/pii/S0959652612002065?via%3Dihub

15 Roberts J., 2010, *Environmental Policy*. Taylor & Francis Group. Accessed May 2020. Available from: https://ebookcentral.proquest.com/lib/tampere/detail.action?docID=667867

16 Scott J. T., 2013, *The sustainable business : a practitioner's guide to achieving long-term profitability and competitiveness : taking the first steps toward understanding, implementing and managing sustainability from a cost/profit perspective*. Sheffield, United Kingdom: Greenleaf Publishing. Accessed May 2020. Available from: https://andor.tuni.fi/permalink/358FIN_TAMPO/i4qs1o/alma9910661788205973